CLAIMS:

1. An expression cassette comprising;

i. a bile salt hydrolase gene, and

ii. a sialic acid-responsive promoter operably linked to the bile salt hydrolase gene.

2. The expression cassette according to claim 1, wherein the bile salt hydrolase gene is a Choloylglycine hydrolase (Cbh) protein-encoding polynucleotide sequence from *Clostridium perfringens*, preferably encoding the amino acid sequence set forth in SEQ ID NO: 13 or a functional variant thereof.

3. The expression cassette according to claim 2, wherein the Cbh protein-encoding polynucleotide sequence comprises a nucleic acid sequence that has at least 80% sequence identity due to redundancy of the genetic code to the nucleic acid sequence set forth in SEQ ID NO: 8 or SEQ ID NO: 9.

4. The expression cassette according to any one of claims 1 to 3, wherein the sialic acid-responsive promoter is pNanA from *E.coli,* preferably comprising the nucleic acid sequence set forth in SEQ ID NO: 4 or a functional variant thereof.

5. The expression cassette according to claim 4, wherein a repressor of pNanA is positioned upstream of pNanA when there is ~~expression~~ activation of pNanA in the absence of sialic acid, wherein preferably the repressor is a NanR protein-encoding polynucleotide sequence, preferably encoding the amino acid sequence set forth in SEQ ID NO: 11 or a functional variant thereof.

6. The expression cassette according to claim 5, wherein the NanR protein-encoding polynucleotide sequence comprises a nucleic acid sequence that has at least 80% sequence identity to the nucleic acid sequence set forth in SEQ ID NO: 5.

7. The expression cassette according to claim 5 or 6, further comprising a constitutive promoter operably linked to NanR, wherein the constitutive promoter is selected from the group comprising pBad with AraC; J23108 with rbs2, rbs 3 or rbs 5; and J23113 with rbs 4.

8. The expression cassette according to claim 7, wherein the constitutive promoter operably linked to NanR is J23113-rbs4.

9. The expression cassette according to claim 8, wherein the cassette comprises J23113-rbs4-NanR, preferably comprising the nucleic acid sequence set forth in SEQ ID NO: 6 or a functional variant thereof.

10. The expression cassette according to any one of claims 5 to 9, further comprising an activator and promoter to increase the expression of Cbh, such as the transcription activator CadC protein-encoding sequence and promoter pCadBA, wherein CadC is positioned downstream and under the control of pNanA and pCadBA is positioned downstream of CadC and operably linked to the bile salt hydrolase Cbh protein-encoding sequence.

11. The expression cassette according to claim 10, wherein the activator and promoter nucleic acid sequence is set forth in SEQ ID NO: 7 or a functional variant thereof.

12. The expression cassette according to any one of claims 1 to 11, wherein the cassette is comprised in one or more plasmid vectors.

13. The expression cassette according to claim 12, wherein the plasmid vector is pEaat, preferably comprising the nucleic acid sequence set forth in SEQ ID NO: 1 or a functional variant thereof.

14. The expression cassette according to any one of claims 1 to 13, further comprising an antibiotic resistance gene flanked by FRT sites to enable its removal.

15. The expression cassette according to any one of claims 1 to 14, wherein the gene polynucleotide sequence for *cbh* is codon-optimised for expression in a probiotic cell, such as set forth in SEQ ID NO: 9.

16. The expression cassette of claim 15, wherein the gene polynucleotide sequence for *cbh* is codon-optimised for expression in a probiotic cell selected from the group comprising *E. coli sp., Bacteroides sp.*, *Clostridium sp., Faecalibacterium sp., Lactococcus lactis,* and *Lactocbacillus sp*.

17. Use of an expression cassette according to any one of claims 1 to 16 for the recombinant production of bile salt hydrolase proteins.

18. A composition comprising:

a) a probiotic bacteria; and

b) an expression cassette of any one of claims 1 to 16,

wherein the probiotic bacteria comprises the expression cassette for production of bile salt hydrolase.

19. The composition of claim 18, wherein the probiotic bacteria is selected from the group comprising *E. coli sp.,* *Bacteroides sp.*, *Clostridium sp., Faecalibacterium sp., Lactococcus lactis,* and *Lactocbacillus sp.*

20. The composition of claim 18 or 19, wherein the probiotic bacteria is auxotrophic.

21. The composition of claim 20, wherein the auxotrophic bacteria has had Alanine racemase genes deleted and cannot divide in the absence of D-Alanine.

22. A composition of any one of claims 18 to 21 for use in a method of treating *C. difficile* infections (CDIs) and/or recurring CDIs (rCDIs).

23. The composition of claim 22, wherein the CDIs and/or rCDIs are caused by dysbiosis.

~~24. A method of treatment or prophylaxis comprising administering to a subject in need of such treatment or prophylaxis an efficacious amount of a composition defined in any one of claims 18 to 21.~~

~~25. The method of claim 24, wherein the subject has a *C. difficile* infection (CDI) or recurring CDI.~~

~~26~~24. Use of a composition of any one of claims 18 to 21 for the manufacture of a medicament for the treatment or prophylaxis of CDI and/or rCDI.

~~27~~25. The use according to claim ~~26~~24, wherein the CDI and/or rCDI is due to dysbiosis.